A CASE STUDY OF FISSURE IN ANO - COMPARISON BETWEEN TOPICAL GLYCERYL TRINITRATE (0.2%) AND LATERAL ANAL SPHINCTEROTOMY

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CHENNAI

BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled **"A CASE STUDY OF FISSURE IN ANO - COMPARISON BETWEEN TOPICAL GLYCERYL TRINITRATE (0.2%) AND LATERAL ANAL SPHINCTEROTOMY"** submitted by **Dr. I. ANANDA KUMAR** to the Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of **M.S Degree Branch – I (General Surgery)** is a bonafide research work were carried out by him under direct supervision & guidance.

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DECLARATION

I **Dr. I. ANANDA KUMAR** declare that, I carried out this work on, **"A CASE STUDY OF FISSURE IN ANO - COMPARISON BETWEEN TOPICAL GLYCERYL TRINITRATE (0.2%) AND LATERAL ANAL SPHINCTEROTOMY"** at the Department of Surgery, Govt. Rajaji Hospital during the period of June 2006 to October 2008. I also declare that this bonafide work or a part of this work was not submitted by me or any others for any award, degree, diploma to any other University, Board either in India or abroad.

This is submitted to The Tamilnadu Dr. M. G. R. Medical University, Chennai in partial fulfillment of the rules and regulations for the M.S degree examination in General Surgery.

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CONTENTS

INTRODUCTION

Anal fissure (fissure-in-ano) is a common anorectal condition. It can be a very troubling condition because, if acute, the severity of patient discomfort and extent of disability far exceed that which would be expected from a seemingly trivial lesion.

Definition

An anal fissure is a linear ulcer or crack in the squamous lining of anal canal that may extend from the mucocutaneous junction to the dentate line. It can be acute or chronic. It may occur at any age but is usually a condition of young adults. Both sexes are affected equally.

AIM OF THE STUDY

Though fissure in ano is a very old entity controversies exist in the management of fissure in ano.

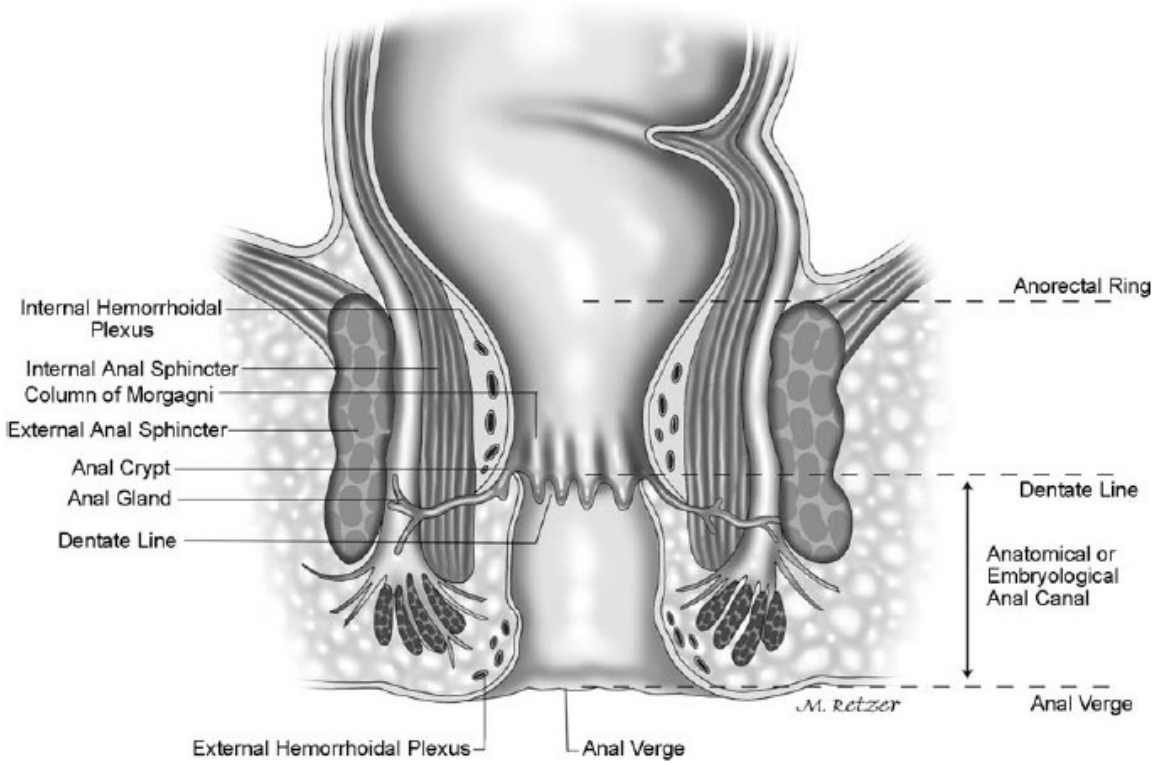
The purpose of this study is to

- To study the etiology and predisposing factors
- Age and sex incidence
- Clinical presentation
- Position of fissure
- Associated features
- Comparative study of topical GTN (0.2%) over Lateral Internal anal sphincterotomy.
- Complications associated with medical and surgical management

ANATOMY OF THE ANAL CANAL

Location and Description

The anal canal is about 1.5 in. (4 cm) long and passes downward and backward from the rectal ampulla to the anus during its lateral walls are kept in apposition by the levator ani muscles and the anal sphincters.


Internal Hemorrhoidal Plexus
Internal Anal Sphincter
Column of Morgagni
External Anal Sphincter
Anal Crypt
Anal Gland
Dentate Line
External Hemorrhoidal Plexus
Anal Verge
Anorectal Ring
Dentate Line
Anatomical or Embryological Anal Canal
Anal Verge
M. Retzer

Relations

- **Posteriorly:** The anococcygeal body, which is a mass of fibrous tissue lying between the anal canal and the coccyx .
- **Laterally:** The fat-filled ischiorectal fossae .
- **Anteriorly:**

  - In the male, the perineal body, the urogenital diaphragm, the membranous part of the urethra, and the bulb of the penis.
  - In the female, the perineal body, the urogenital diaphragm, and the lower part of the vagina

Anatomical anal canal

It is the portion anal canal from anal verge to the dentate line.

Surgical anal canal

It is the portion of anal canal from anal verge to the ano rectal ring.

Structure

The mucous membrane of the upper half of the anal canal is derived from hindgut endoderm . The **pectinate line** or **Dentate line** indicates the level where the upper half of the anal canal joins the lower half.

UPPER HALF

- It is lined by columnar epithelium.
- It is thrown into vertical folds called anal columns, which are joined together at their lower ends by small semilunar folds called anal valves (remains of proctodeal membrane) .
- The nerve supply is the same as that for the rectal mucosa and is derived from the autonomic hypogastric plexuses. It is sensitive only to stretch.

LOWER HALF

The mucous membrane of the lower half of the anal canal is derived from ectoderm of the proctodeum. It has the following important features:

- It is lined by stratified squamous epithelium, which gradually merges at the anus with the perianal epidermis .There are no anal columns .
- The nerve supply is from the somatic inferior rectal nerve; it is thus sensitive to pain, temperature, touch, and pressure.

Muscle Coat

As in the upper parts of the intestinal tract, it is divided into an outer longitudinal and an inner circular layer of smooth muscle .

The longitudinal smooth muscle of the anal canal is continuous above with that of the rectum. It forms a continuous coat around the anal canal and descends in the interval between the internal and external anal sphincters. Some of the longitudinal fibers are attached to the mucous membrane of the anal canal, whereas others pass laterally into the ischiorectal fossa or are attached to the perianal skin.

Anal Sphincters

The anal canal has an involuntary internal sphincter and a voluntary external sphincter. The internal sphincter is formed from a thickening of the smooth muscle of the circular coat at the upper end

of the anal canal. The internal sphincter is enclosed by a sheath of striped muscle that forms the voluntary external sphincter.

The external sphincter can be divided into three parts:

- **A subcutaneous part**, which encircles the lower end of the anal canal and has no bony attachments.
- **A superficial part**, which is attached to the coccyx behind and the perineal body in front.
- **A deep part**, which encircles the upper end of the anal canal and has no bony attachments.

Puborectalis muscle

The puborectalis fibers of the two levator ani muscles blend with the deep part of the external sphincter. The puborectalis fibers of the two sides form a sling, which is attached in front to the pubic bones and passes around the junction of the rectum and the anal canal, pulling the two forward at an acute angle.

At the junction of the rectum and anal canal, the internal sphincter, the deep part of the external sphincter, and the puborectalis muscles form a distinct ring, called the **anorectal ring**, which can be felt on rectal examination.

Blood Supply

Arteries

The arterial supply of upper half is that of the hindgut namely, the **superior rectal artery**, a branch of the inferior mesenteric artery.

The arterial supply of lower half is the **inferior rectal artery**, a branch of the internal pudendal artery which is a branch of internal iliac artery.

Veins

The venous drainage of upper half is mainly by the **superior rectal vein**, a tributary of the inferior mesenteric vein, and the portal vein.

The venous drainage lower half is by the **inferior rectal vein**, a tributary of the internal pudendal vein, which drains into the internal iliac vein.

Lymph Drainage

- The lymphatic drainage is mainly upward along the superior rectal artery to the pararectal nodes and then eventually to the inferior mesenteric nodes .

- The lymph drainage is downward to the medial group of superficial inguinal nodes.

Nerve Supply

The mucous membrane of the upper half is sensitive to stretch and is innervated by sensory fibers that ascend through the hypogastric plexuses.

The lower half is sensitive to pain, temperature, touch, and pressure and is innervated by the inferior rectal nerves.

The involuntary internal sphincter is supplied by sympathetic fibers from the inferior hypogastric plexuses.

The voluntary external sphincter is supplied by the inferior rectal nerve, a branch of the pudendal nerve, and the perineal branch of the fourth sacral nerve.

PHYSIOLOGY OF THE ANORECTUM

The mechanism that maintains anorectal continence and facilitate defecation are related and complex. A clear understanding of Anorectal physiology has been made possible by introduction of several newer methodologies like Anorectal manometry and Electromyography designed to quantitate parameters of anorectal physiology.

Factors Maintaining Fecal Continence :

The factors maintaining fecal continence are

1. Anal canal high pressure zone – (Anal sphincter mechanism)
2. Anorectal angle and co-ordinated activity of the pelvic floor musculature
3. Anorectal sensory and reflex mechanisms
4. Distensibility, ‘tone’ and capacity of rectum
5. Rectal motility and evacuability
6. Colonic transit
7. Anal Canal motility
8. Stool volume and Consistency

Anal Canal High Pressure Zone :

The mean length of the Anal Canal high pressure zone is 4 cm. During anal sphincter squeeze, the canal lengthens, whereas during straining it shortens.

Resting pressure :

The EAS & IAS envelop the anal canal and are responsible for maintaining resting and generating squeeze pressures. The highest resting pressure are recorded 1-2 cm proximal to Anal verge.

The mean Anal canal resting pressure is approximately 90 cm H2O. IAS contributes about 85% of resting tone of the Anal canal. Resting anal pressures are found elevated in individuals with fissure in ano, performed with **balloon rectosphincteric manometry**.

SQUEEZE PRESSURE :

It is generated by contraction of the EAS and the puborectalis muscle. The squeeze pressure may also be distributed unequally around the Anal Canal. Maximum squeeze pressure elevation lasts less than 1 minute, as the sphincter fatigues rapidly after that time.

ANORECTAL ANGLE :

It maintain hour to hour faecal continence formed predominantly by the anteriorly directed pull of the puborectal muscle

as it envelops anorectum at the level of Anorectal ring. The mean angle is 102+13 degree at rest in left lateral position. Standing change the angle slightly, sitting widens the Angle significantly to 119+17. Valsalva maneuver, Sharpen the angle to 81+19.

It enables the Anterior wall of the rectum to act as a 'flap valve' at the Anorectalring. Wherever the abdominal pressure increases, the walls of the Anal canal flatten as they pass through an anteroposterior slit in the pelvic diaphragm to maintain continence.

Finlay and colleague found that, expulsion of air was achieved by a sharpening of Anorectal Angle increase in anal canal pressure and intra rectal pressure. Conversely, expulsion of liquids was achieved by a widening to Anorectal Angle, decreasing anal canal pressure and increasing intra rectal pressure.

Rectal Anal sphincter inhibitory response (RASIR) :

With acute rectal distention, the rectal wall contracts slightly, the proximal portion of the Anal canal releases (IAS) and distal portion contracts (EAS). The role of the Rectal Anal sphincter inhibitory response is not fully understood.

Rectal Distensibility and Capacity :

The Rectum accommodates passively to distention – intra luminal pressure remains low, where as intra luminal volume increases. Maximum tolerable volume in healthy individuals approximates 400 ml.

Motility of Rectum and Anal Canal :

Infrequently small amplitude of contractions have been recorded in the rectum in electroencephalic studies. The mean amplitude of these waves is about 10+3 cms in H2O.

Three types of contractions have been observed.

1. Simple contractions of frequency 5-10 cycles / min
2. Contractions with amplitude of upto 100cm H2O
3. Slow contraction of high amplitude.

In case of fissure in ano, the slow contractions with high amplitude is increased.

It has been demonstrated that patients with anal fissures have abnormal ‘over shoot’ contraction of their IAS following expected relaxation due to rectal distention.

ETIOLOGY AND PATHOGENESIS

Aetiology – Trauma to the anal canal is the most common initiating factors usually in the form of passage of a large hard faecal mass.

Among the predisposing factors are –

- Inflammatory bowel disease.
- Previous anal surgery particularly haemorrhoidectomy.
- Anterior fissure develops in women due to child birth trauma.
- Persons taking laxatives or saline purgatives for a long period develops a degree of anal stenosis which may predispose to fissure formation , such patients have had only liquid motions for months or years and their anal canal has undergone some degree of contraction so that a sudden passage of a hard scybalous mass could be particularly difficult and traumatizing to it.
- Large haemorrhoids and hypertrophied anal papillae may cause fissure due to traction when these prolapse at defecation.
- Enthusiastic use of ointments for variety of anal conditions causes thinning of skin of the anal canal thus predisposing to an easy tear.

- Sometimes trauma to anal canal caused by nozzle of enema, results in fissure .
- Rarely passage of a sharp foreign body in stool may cause a fissure.

Pathophysiology.

The spasm of the internal sphincter may prevent its healing by approximating the edges of the ulcer and preventing adequate drainage. The resulting pressure with the internal sphincter is higher in patients with an anal fissure than normal controls. Normally rectal distension causes a reflex relaxation of the internal sphincter and contraction of the external sphincter. In patients with fissure this relaxation of the internal sphincter is followed by an abnormal contraction. Following successful treatment this abnormal contraction of the internal sphincter disappears.

Physiology of sphincter relaxation

An understanding of the physiology of the IAS sheds some light on the pathophysiology of anal fissures as related to increased IAS tone and response to non-surgical treatment. The basal tone of

the IAS is dependent on intracellular calcium. Therefore contraction of the smooth muscle cells within the IAS is mediated by influx of calcium through calcium channels, but it is also affected by neurohormonal stimulation of α1- adrenoreceptors at the smooth muscle cells. Activation of α2-adrenoreceptors in the myenteric inhibitory neurons most likely presynaptically inhibits non-adrenergic, non-cholinergic (NANC) relaxation. Relaxation of these cells is mediated through directly decreasing intracellular calcium concentration as well as increasing cGMP and cAMP. Potassium influx hyperpolarizes the cell membrane and decreases calcium entry. Activation of β2- adrenoreceptors increases cAMP, returning intracellular calcium to the sarcoplasmic reticulum.

In addition, there are inhibitory neurotransmitters that mediate NANC relaxation, including nitric oxide (NO) and vasoactive intestinal peptide (VIP). NO is the major neurotransmitter mediating NANC relaxation of the IAS by increasing cGMP. VIP, like β2- adrenoreceptors increases cAMP13,14. L-arginine, a precursor of nitric oxide, has been found to relax IAS smooth muscle perhaps by increasing substrate for nitric oxide synthase (NOS), the

enzyme involved in NO synthesis15. A preliminary study has shown reduced NOS in the IAS of patients with anal fissures compared to controls.

Why fissure is more common posteriorly ?

An anal fissure is typically found in the posterior midline just within the anal verge. More than 98% of fissure in males and nearly 85% in females occur in this way.

Various hypothesis are

- The superficial external anal sphincter arise from the tip and side of the coccyx and surrounds the anal canal leaving a weak area on the posterior wall this causes it to tear when it is over stretched during the passage of a hard stool.
- Anal crypts are more marked posteriorly and which tends to harbour subclinical infection, which causes the epithelial lining to be friable.
- The lower portion of this muscle is not truly circular, but rather consists of a band of muscle fibers that pass from posterior to anterior and split around the anus. The anal mucosa is,

therefore, best supported laterally and is weakest posteriorly. The decreased anterior support in women accounts for the greater occurrence in this location than in men.

- Another theory that has been suggested is related to the blood supply to the area. Klosterhalfen and colleagues visualized the inferior rectal artery by means of postmortem angiography, by manual preparations, and by histologic study following vascular injection. They determined that in 85% of specimens, the posterior commissure is less well perfused than other areas of the anal canal. Hence, ischemia may be an important etiologic factor in causing anal fissure, especially in the posterior location. The blood supply, which is already tenuous, may be further compromised by compression and contusion as the branch of the inferior rectal artery passes through the internal anal sphincter.
- Anterior fissure in women (15%) is often due to trauma of parturition causing old tear to break down.

Acute and Chronic fissures

An acute fissure is an ulcer, the base of which is formed by longitudinal muscle fibres. When it become chronic , the deeper circular fibres of the internal sphincter are seen to form the floor of the fissure.

The sentinel piles develops due to combination of infection and oedema.

Infection of the base may lead to an abscess, which may rupture through the base of the fissure or through the skin near by leaving a short subcutaneous fistula.

There is no real agreement as to what constitutes a chronic anal fissure. One definition is that a fissure is chronic when it has become a clearly recognized, well-circumscribed ulcer.

A chronic fissure thus has four typical features -

(1) A boat shaped ulcer with indurated edges.

(2) Fibres of internal sphincter forms the floor.

(3) A rounded swelling (hypertrophied anal papilla) at its upper end.

(4) A tag of skin at its lower end (sentinel piles).

Why fissure fail to heal ?

Why some fissures heal spontaneously and others become chronic is an unresolved question.

- Ischemia, infection, or lymphatic obstruction secondary to persistent inflammation may be responsible.
- An anthropomorphic explanation for the occurrence of skin tags and papillae, it is as if healing cannot take place across the defect produced by the fissure, so the body attempts to heal it through overgrowth on the proximal and distal ends of the defect.

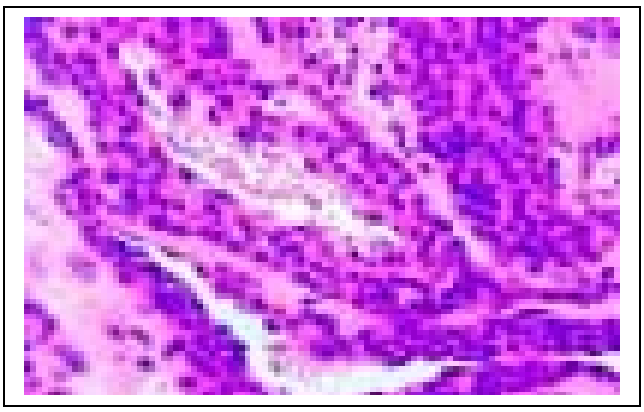
Atypical fissures

An anal fissure situated away from the midline usually has a cause within the anal canal in the form of a fibrous polyp , large haemorrhoids or a hypertrophied anal papilla. If a cause is not found , such a fissure should immediately raise suspicion of another pathology (example – tuberculosis, syphilis, leukemia, squamous cell carcinoma ,inflammatory bowel disease especially Crohn's disease and sarcoid)

Fissure in inflammatory bowel disease tends to be multiple, broad and situated away from the midline. The spasm normally associated with a nonspecific fissure is minimal or absent.

HISTOPATHOLOGY

Nothing in particular is histologically diagnostic of an anal fissure. If the lesion is excised and submitted for pathologic examination, usually typical nonspecific inflammatory changes are observed. Brown and colleagues prospectively studied 18 consecutive patients who underwent internal anal sphincterotomy for chronic anal fissure and took a biopsy specimen from the base and also from the muscle before division. Histologic evaluation confirmed the presence of fibrosis throughout the internal sphincter, but no such finding was identified in controls.



CLINICAL FEATURES

SYMPTOMS

ACUTE FISSURE

PAIN

Pain of tearing, cutting or burning type associated with defecation and lasting for a variable period after defecation is the symptom. With the onset of suppuration the pain become throbbing in character and continuous. Each act of defecation become an agony due to fear of pain the act of defecation may be postponed leading to constipation. A vicious cycle of pain, constipation and pain is setup.

BLEEDING

Bleeding is seldom more than a few drops and is bright in color. Streaks of blood may be seen on the stool surface.

- Reflex symptom of dysuria or pain radiating down the thighs is common.

CHRONIC FISSURE

In chronic fissure, irritation, pruritus and discharge which soils the underclothing are present .

Bleeding may or may not be present .

A swollen skin tag be felt outside the anus (sentinel piles). Problems with micturition (e.g., retention, urgency, frequency) and dyspareunia occasionally accompany the symptoms of both acute and chronic fissure.

EXAMINATION

ACUTE FISSURE

Gentle traction on the anal margin along with a request to bear the discomfort will show the lower end of the fissure..

Applying a local anaesthetic ointment to the fissure is important before doing a rectal examination.

An acute fissure being a shallow ulcer is impalpable, though the sphincter spasm is marked. Proctoscopy is avoided in these cases.

Palpation will usually demonstrate a spastic anal sphincter or tight anal canal and will exacerbate the patient's discomfort. The open wound is often not appreciated by the examining finger in a patient with an acute anal fissure. Because the cut is relatively superficial, there is usually no fibrosis.

ANOSCOPY AND SIGMOIDOSCOPY

Anoscopic examination, if possible, confirms the location of the fissure. The ability to perform this examination, however, may reflect the chronicity of the problem. Ideally, proctosigmoidoscopic examination should be carried out before any surgical procedure to establish that the rectum, at least, is not involved by inflammatory bowel disease or other pathologic entity.

CHRONIC FISSURE

- In chronic fissure the presence of a sentinel piles is noted.

A hypertrophid anal papilla may be felt at the upper end of the fissure in a chronic case. Gently proctoscopy will show the presence of associated haemorrhoids,hypertrophied papilla or a fibrous polyp.

Sigmoidoscopy is not essential for the diagnosis but must be done after acute symptoms have subsided or before surgery to rule out inflammatory bowel disease or associated pathology.

Differential Diagnosis –

An ulcer situated away from the midline should immediately arise suspicion of –

- A **traction fissure**, the cause of which lies within the anal canal is excluded by digital and proctoscopic examination.
- A **tuberculous ulcer** has undermined edges and the discharge is thin and watery. The presence of a lesion in the chest, a raised ESR, sputum examination and a biopsy may be necessary to reach a diagnosis.
- A **primary chancre** has a good deal of induration along with inguinal lymphadenopathy. Secondary syphilis presents as multiple fissure. The Wassermann reaction is strongly positive.
- A **malignant ulcer** has indurated and raised edges and is resistant to the local treatment . Biopsy is needed for the diagnosis.

- **Fissure in inflammatory bowel disease** are multiple, indolent and resistant to local treatment. Proctoscopy and sigmoidoscopy reveals the pathology within the rectum.

- Multiple acute fissure may occur following sodomy in which a history of **anal intercourse** can be obtained. Possibility of HIV infection being transmitted through this route should be kept in mind.

- **Idiopathic stenosis of internal sphincter** – It occur in certain older patients usually women, who have been accustomed to taking aperients over many years so that the anal canal has for a long time been spared the regular dilation action of a normal solid motion. As a result the internal sphincter undergo contraction and may become fixed in this contracted condition by fibrosis.There may be no symptom or when the contraction become extreme, the patient may find difficulty in passing motions.

TREATMENT

- Conservative
- Medical
- Surgical

CONSERVATIVE LINE OF MANAGEMENT

(Dietary and life style modifications.)

Many fissure heals spontaneously in two or three weeks. These are usually superficial lesion which have been attended by a short history of pain. In contrast a chronic fissure are most resistant to any form of conservative treatment, though there may be temporary relief of symptoms, but the trouble tends to recur frequently.

Treatment of acute anal fissure is nonsurgical unless the fissure is due to traction when excision of fibrous polyp or the anal papilla will remove the chance of its recurrence.

- Adequate fluid intake
- **Fibre rich diet**. A diet should be rich in vegetables, fruits and brown rice.
- **Bulk forming agents** like psyllium husk and bran can be given after meals.
- Repeated anal trauma by passage of hard faeces can be avoided by laxatives such as liquid paraffin and lactulose are especially suitable for they tend to produce soft easily passage motions.

Drastic purgation must be avoided since frequent passage of loose stools causes agony.

- Surface anaesthetic ointment (5% Xylocaine) and oral analgesics are helpful to reduce pain.
- Metronidazole and a suitable broad spectrum antibiotics will hasten recovery.
- Frequent Sitz bath are comforting and help to reduce the sphincter spasm.

MEDICAL LINE OF MANAGEMENT

It is usually a combination of conservative treatment along with **chemical sphincterotomy**.

The object of medical management are –

- Relief of pain.
- Complete relaxation of the internal sphincter.
- Healing of the fissure

Medical management of acute fissure in ano – Is by using an agent which produce relaxation of internal sphincter, this process is known as “Chemical Sphincterotomy” .Some of the agents used for chemical sphincterotomy are –

- Glyceryl trinitrate .
- Calcium channel blockers- Nifidipine and Diltiazem
- Neurotoxins
    - Botulinum toxin
    - Gonyautoxin

Newer Agents

These drugs are under trail

- Phosphodiesterse inhibitors -Topical Sildenafil.
- Potassium channel openers-Minoxidil.
- L-Arginine – Precursor of NO.
- Adrenergic antagonist –Indoramin
- Angiotensin converting enzyme inhibitors–Topical Captopril
- Hyperbaric Oxygen.

Some of the obsolete agents and methods are –

- Sclerotherapy.
- Cholinergic Agonist -Bethenecol cream.
- Solcoderm - 5 Fluro uracil and salicylic acid ointment.

Glyceryl trinitrate (GTN) – It is a vasodilator and smooth muscle relaxant. It releases nictric oxide which is an inhibitory neuro - transmitter. The drug is used as 0.2% cream applied locally to the anal canal BD or TDS for 6 to 8 weeks. When applied as an 0.2% ointment to the anal canal produce sufficient relaxation of the sphincter to allow the fissure to heal in upto two third of patients. In addition glyceryl trinitrate being a vasodilator improves blood flow to the area and this aids healing. Unfortunately glyceryl trinitrate ointment may produce severe head ache.

Isosorbide dinitrate – As 1% ointment has also been used in past to produce chemical sphincterotomy but again it has head ache a prominent side effect.

Calcium Channel Blockers

Like Nifedipine and Diltiazem – are antihypertensive vasodilators and act by blocking the transport of calcium. . Local application are better than oral medications.Side effect are headache, postural hypotension and perianal itching.

Nifedipine : Nifedipine given orally as 20 Mgs BD or applied as 0.5% cream BD for 4 to 6 weeks .

Diltiazem : Diltiazem (DTZ) is another calcium channel blocker that has been proffered as an alternative for the treatment of chronic anal fissure. Diltiazem given 60Mgs BD as oral form or applied as 2% cream BD for 4 to 6 weeks

Botulinum Toxin – It is a striated muscle relaxant and acts by inhibiting acetylcholine release at the neuromuscular junction. 30 units of Botulinum Toxin A injected into the internal sphincter on either side of the fissure once a month.

The average healing rates of 47 to 65% has been reported .

Local side effects of flatus incontinence, increase in residual urine, muscle weakness, fecal soiling have been seen.

Gonyautoxin : It a phycotoxin produced by shellfish, has also been used in anal fissure management. In a recent report56, 23 patients were injected with 100 units in the IAS every 4 days. Total remission

was achieved in all patients within 7-14 days. No relapses were observed during the 10 month follow-up. No side-effects were noted.

SURGICAL LINE OF MANAGEMENT

The choice of operative approach to the treatment of anal fissure depends on the duration of symptoms and on the physical findings.

The aim of the surgical treatment is to modify the function of the internal sphincter so that it cannot go into spasm and to increase the diameter of the anal canal outlet so that it would offer less resistance to the passage of stools.

- Sphincter stretch
- Internal anal sphincterotomy - which may be Posterior or Lateral anal sphincterotomy.
    - open method
    - closed method

Stretching of the anal outlet as advocated by Recamier, is used in acute fissure when there is no response to conservative treatment. The procedure should be done under general anaesthesia .It involves gradual stretching of the anal sphincters over several minutes to effect a temporary

paralysis of the internal and external sphincter muscles for several days to week thus allowing the ulcer to heal. There is no anal wound and the patient can return to work the next day.

Due the risk of incontinence following the procedure , have now made it unpopular. Stretching should not be done in the presence of a traction fissure or in a fissure associated with large internal haemorrhoids since a prolapse of the haemorrhoids often follows the procedure.

Sphincterotomy

Posterior sphincterotomy

Internal sphincterotomy was first advocated by Eisenhammer. The sphincter is divided in its lower half in the posterior midline through the fissure itself. The posterior wound thus created takes a long time to heal resulting in a **key-hole deformity.**

The classic operation of Gabriel removes the fissure along with a triangular area of skin and adds a sphincterotomy in the posterior midline. The result is a large wound which takes a long time to heal,though the recurrence rate is small (1 to 2%) and the patient needs hospitalization for one week.

LATERAL SPHINCTEROTOMY

Recently the sphincterotomy performed laterally and the full thickness of the muscle is divided in its lower half. It can be done by the subcutaneous technique, under local or general anaesthesia, the procedure is known as **closed subcutaneous lateral internal sphincterotomy**.

The fissure need not to be treated though a large sentinel pile or a prolapsed hypertrophied anal papilla should be removed. There is little post operative discomfort and the wound heals quickly .

Complications include haemorrhage, perianal abscess formation and a minor degree of loss of anal control.

Postoperative Care

Sitz baths and a mild analgesic are the only postoperative measures advised. Pain is often less than that experienced preoperatively, and most patients resume their normal activities within 48 hours.

Complications

- ecchymosis, hematoma,haemorrhage
- Perianal abscess
- fecal incontinence
- keyhole deformity

Open versus Closed

Walker and colleagues reviewed their experience with lateral internal anal sphincterotomy for anal fissure and stenosis in more than 300 patients. Sphincterotomy was performed by several techniques (open, closed, multiple) and under diverse circumstances, so it is difficult to interpret the results.

It is apparent, however, that complications were lowest after the closed procedure (20%) and highest for open sphincterotomy (55%). Anal fistula occurred in three patients (l%). In the entire series, 15% reported various control difficulties, and when very strict criteria for evaluation of morbidity were used, minor complications occurred in 36%.

DERMAL FLAP COVERAGE OF THE FISSURE.

In patients sphicterotomy is done along with exicision of fissure,the defect can be closed with mucosal or dermal advancement flap.

Proforma for study of Fissure in ano

1. Serial number :
2. Name :
3. Age :
4. Sex :
5. IP no :
6. Address :
7. Occupation :
8. Date of admission :
9. Date of surgery :
10. Date of discharge :
11. Complaints
12. Duration :
13. Predisposing factors :
14. Co morbid illness :
15. Previous surgery :
16. Laxative use :
17. Post pregnancy (females):
18. Personal history :
19. Previous incontinence :

Examination

1. Built :
2. Anemia :
3. Jaundice :
4. vital signs :
5. CVS :
6. RS :
7. Abdomen :
8. Digital rectal examination :
9. Proctoscopy :
10. Position :
11. Sentinel skin tag :
12. Hypertrophied papilla :

Investigations

1. Hb :
2. Tc :
3. Dc P L E :
4. Urine (alb/sug/deposits) :
5. Blood sugar :
6. Blood urea :
7. Serum creatinine :
8. Chest X- ray :
9. ECG :

TREATMENT

MEDICAL MANAGEMENT

COMPLICATIONS

1. Pain :
2. Headache :

Healing of fissure-

SURGICAL MANAGEMENT

1. Duration of surgery:
2. Anesthesia :
3. Position :
4. Method :

COMPLICATIONS

1. Pain :
2. Seroma :
3. Haematoma :
4. Infection :
5. Abcess :
6. Fistula :
7. Incontinence(flat/faeces) :

Healing of fissure -

MATERIALS AND METHODS

This study is based on analysis of 104 patients with fissure in ano who under went treatment in Govt. Rajaji Hospital, Madurai, from May 2006 to October 2008.

These patients were broadly divided into two groups of 54 patients each who were managed by medical and surgical methods.

For all these patients clinical examinations and routine investigations were done, which also include blood for sugar, urea and serum for creatinine and ECG.

Chest X ray was taken for all cases.

Patients who are on medical management are put on 0.2% glyceryl tri nitrate ointment topically over the perianal region twice daily.They were also adviced high fibre diet,adequate hydration and antibiotics T.ciprofloxacin 500 mg bd and T.metronidazole 500mg tds for 5 days. All patients were adviced sitz bath twice daily.

Patients who are on surgical management were treated by open lateral anal sphincterotomy. post operatively they were adviced twice

daily sitz bath along with high fibre diet and adequate hydration.T.ciprofloxacin 500mg bd and T.metronidazole 500mg tds were given for 5 days .

Patients were observed for expected complications. Patients were discharged on 5th day.They were asked to follow up in out patient department every weekly for one month.

PREOP INSTRUCTIONS

1. Informed written consent was taken.
2. Basic investigations
3. NPO from 9 00 pm of previous day
4. INJ Tetanus toxide 0.5 cc im
5. INJ Xylocaine test dose
6. Pre op antibiotic prophylaxis with inj cefotaxime 1g iv ATD
7. T.dulcolax 2hs
8. T.diazepam 5mg hs
9. Preparation of perineum ,abdomen and back.

10. Plain water enema on 8 pm of previous day and 6 00 am on the day of surgery.

OBSERVATION

ANALYSIS AND RESULTS

This study is based on the analysis of 104 patients who were treated for fissure in ano in Govt.Rajaji Hospital, Madurai from May 2006 to Oct 2008.

AGE AND SEX DISTRIBUTION

The age and sex distribution of these 104 patients are shown in the table. Out of these, 76 were male and 16 were female.

Male to female ratio is approximately 3:1. Lowest age of patients in this study is 16. Highest age of patient in this study was 62 years.

The maximum number of patients were in the age group of 41-50years.

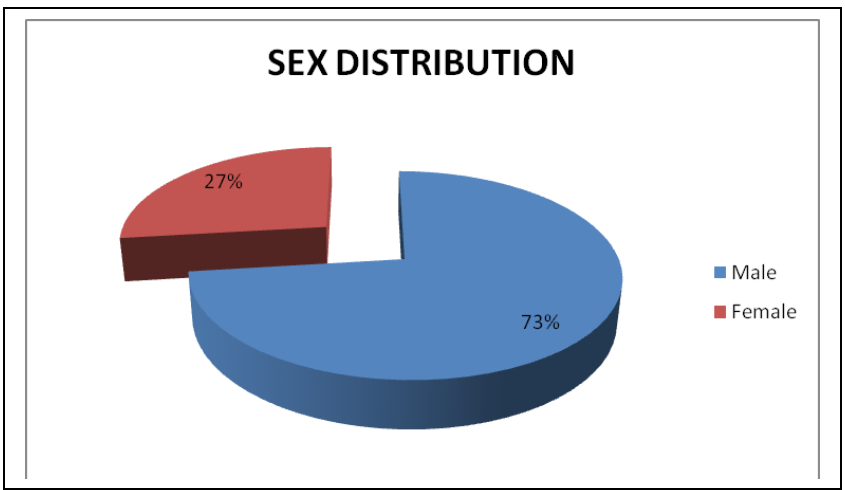


TABLE 1

AGE AND SEX DISTRIBUTION

AGE GROUP	MALES	FEMALES	TOTAL	%
11-20	5	4	9	8.7
21-30	13	6	19	18.2
31-40	17	9	26	25
41-50	25	12	37	35.5
51-60	6	3	9	18.7
>60	3	1	4	3.8

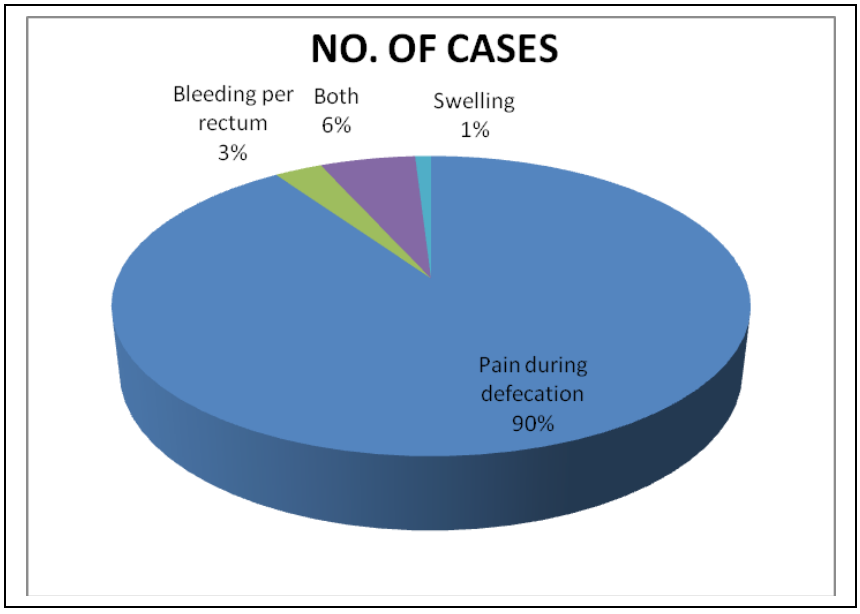
SYMPTOMATOLOGY

The symptomatology of these patients are shown in the table. Majority of these patients had history of pain during defecation and bleeding per rectum. Other symptoms were swelling in the perianal region and retention of urine.

TABLE 2

SYMPTOMATOLOGY

SYMPTOM	NO. OF CASES	%
Pain during defecation	94	90.3
Bleeding per rectum	3	2.8
Both	6	5.7
Swelling	1	0.9



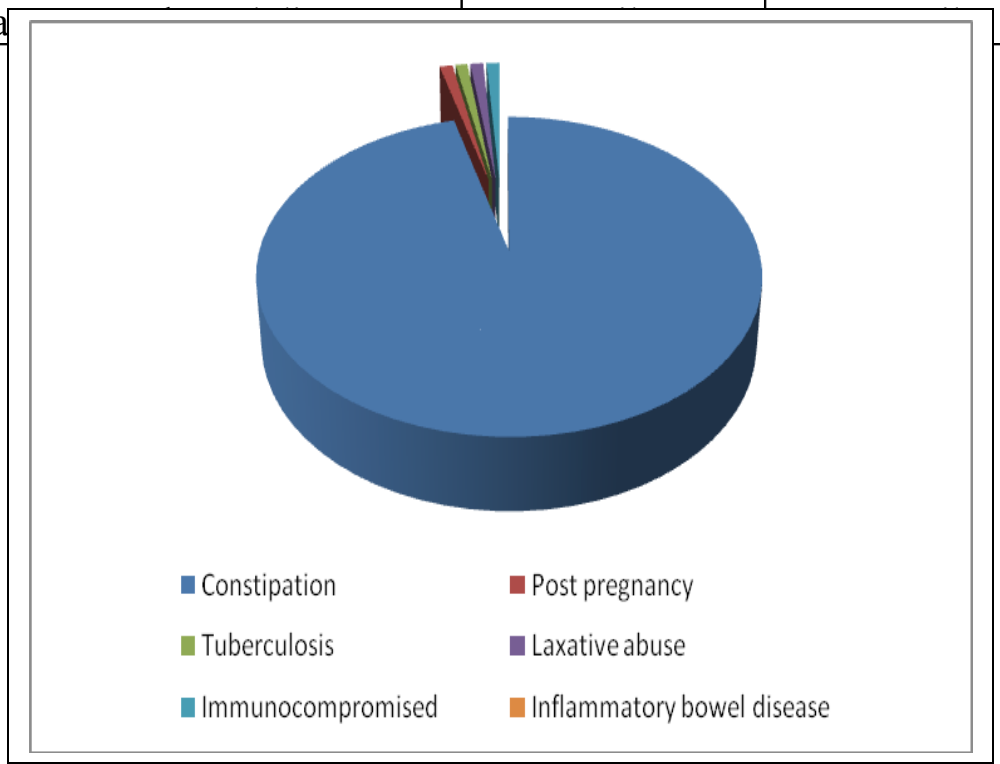
PREDISPOSING FACTORS AND AETIOLOGY

Most of these patients had constipation as the major predisposing factor. Other predisposing factors were laxative abuse, post-pregnancy, tuberculosis, inflammatory bowel disease and immunocompromised state.

In this study, 1 patient had history of GI tuberculosis, 2 patients were HIV positive and 2 patients presented immediately after delivery and 2 patients had history of chronic laxative abuse.

TABLE 3 AETIOLOGY AND PREDISPOSING FACTORS

AETIOLOGY	NO. OF CASES	PERCENTAGE
Constipation	97	93.2
Post pregnancy	2	1
Tuberculosis	1	0.9
Laxative abuse	2	1
Immunocompromised	2	1
Infla		



LOCATION OF FISSURE

Majority of the patients who were examined by digital rectal examination had posterior fissure in ano.

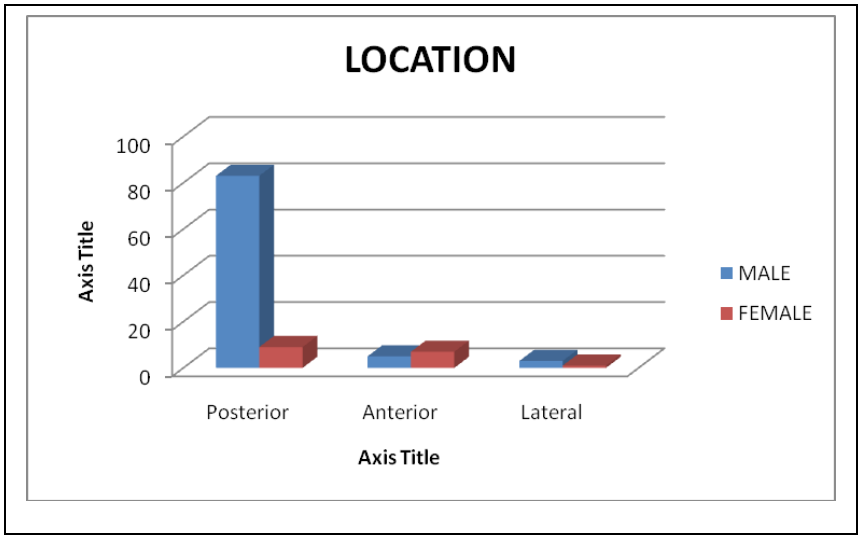
Minority of patients had anterior fissure which is more common with females.

Lateral fissure was seen in few patients, the details are shown in the table.

TABLE 4

LOCATION

LOCATION	TOTAL	MALE	FEMALE
Posterior	92	83	9
Anterior	12	5	7
Lateral	4	3	1



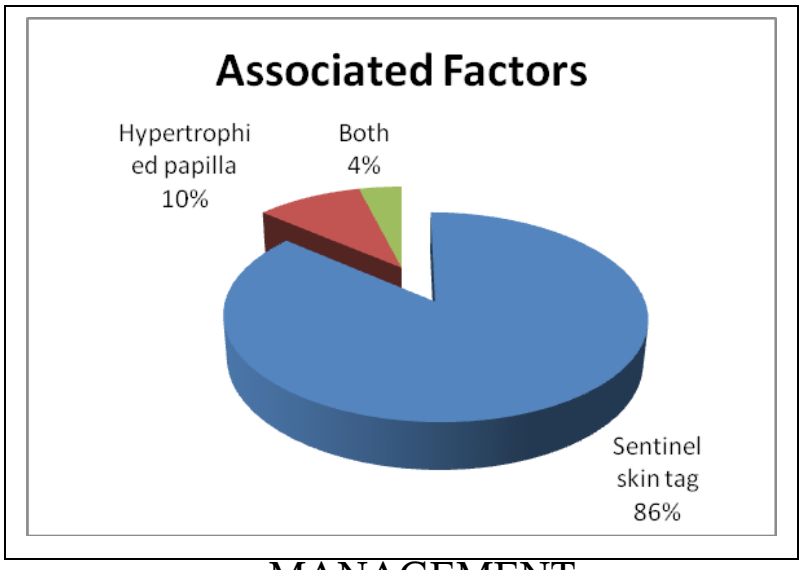
ASSOCIATED FACTORS

Majority of patients who had fissure for longer duration had sentinel skin tag along the lower part of fissure and hypertrophied papilla in the upper part.

TABLE 5

ASSOCIATED FACTORS

ASSOCIATED FACTORS	NO.OF CASES	PERCENTAGE
Sentinel skin tag	88	84.6
Hypertrophied papilla	10	9
Both	4	3



MANAGEMENT

MEDICAL

52 patients out of 104 were managed by medical and conservative method of treatment. All patients were advised high fibre diet and adequate hydration and oral antibiotics.

All patients were put on 0.2% Glyceryl trinitrate ointment twice daily topically after sitz bath.

All patients were followed weekly In outpatient department for one month.

Results were inferred by relief of pain and healing of fissure.

38 out of 82 patients had relief of symptoms, which accounts to 70.4% of patients who were treated medically.

Other patients had persistent pain and complications like headache.

TABLE 6

	NO.OF PATIENTS	MALE	FEMALE	PERCENTAGE
RELIEF OF SYMPTOMS	38	28	10	73
FAILURE	14	11	3	27

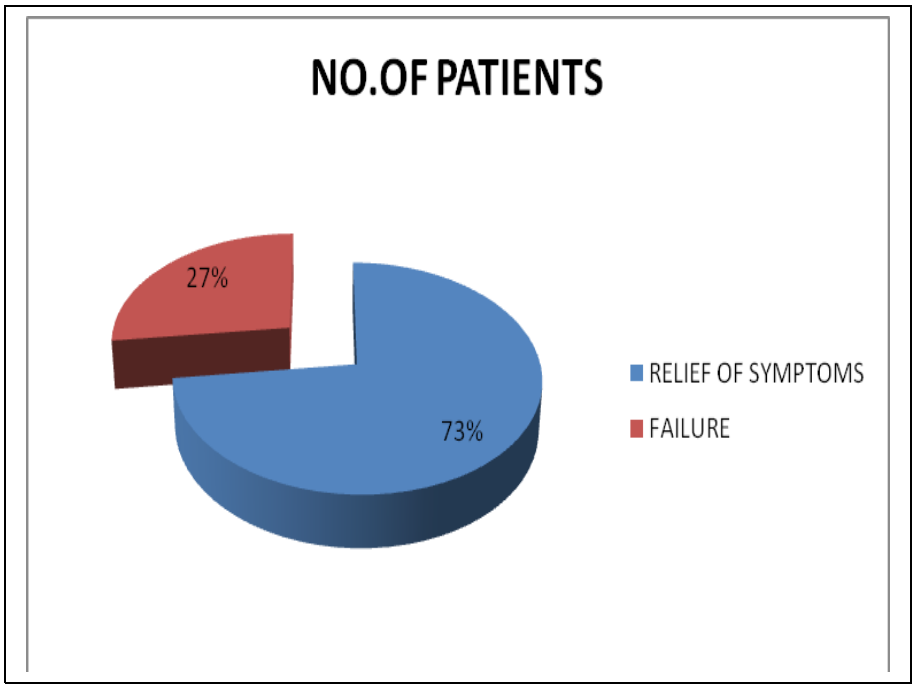
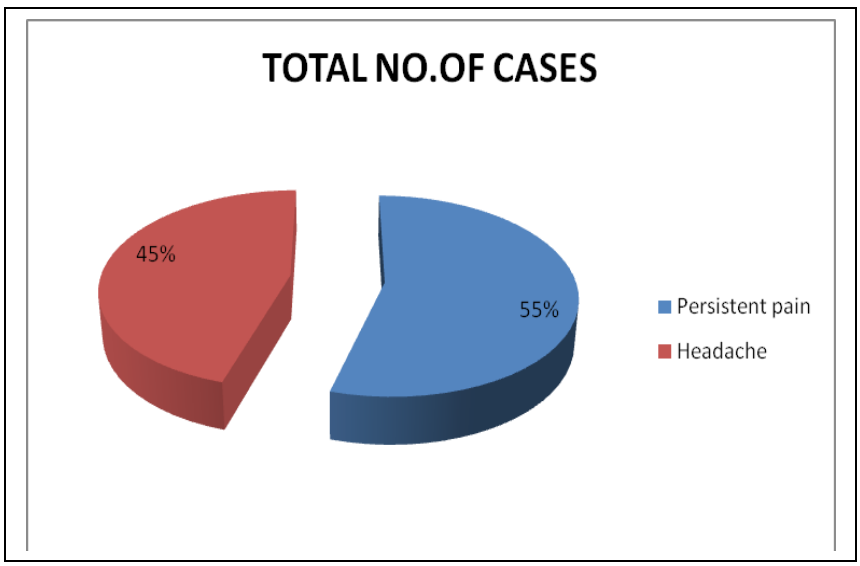


TABLE 7

COMPLICATIONS OF MEDICAL MANAGEMENT

COMPLICATIONS	TOTAL NO.OF CASES	PERCENTAGE
Persistent pain	12	23%
Headache	10	19.2%



12 of the patients who were managed medically required conversion to surgical treatment due to failure of medical management.

SURGICAL MANAGEMENT

52 patients out of 104 were treated by surgical line of management. All patients were treated by open lateral anal sphincterotomy under spinal anaesthesia. Duration of surgery was approximately twenty minutes.

46 out of 52 patients had relief of pain and healing of fissure, which corresponds to 88.5%. Some of the patients had complications as follows.

TABLE 8

	NO.OF PATIENTS	MALE	FEMALE	PERCENTAGE
RELIEF OF SYMPTOMS	46	34	12	88.4
NO RELIEF	6	6	0	11.1

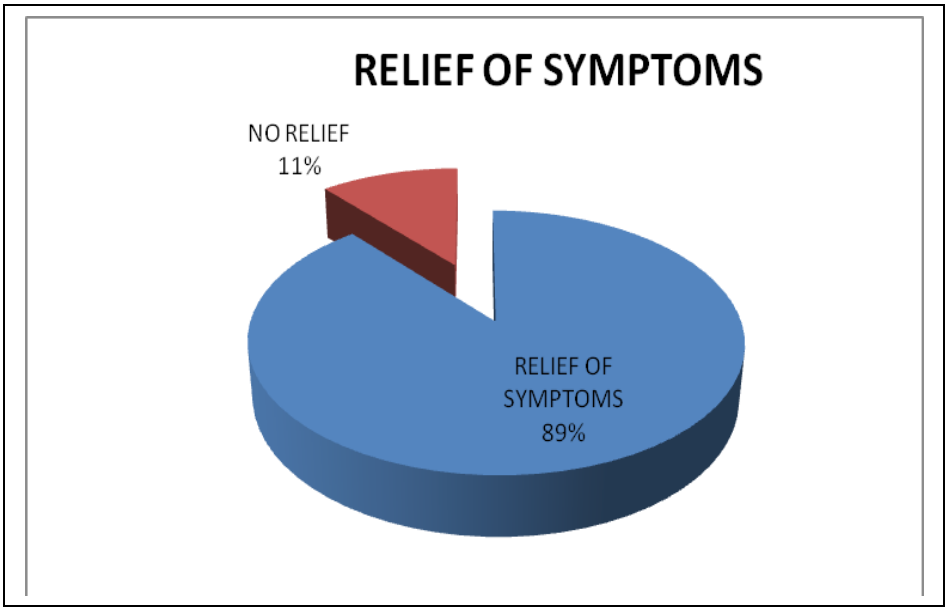
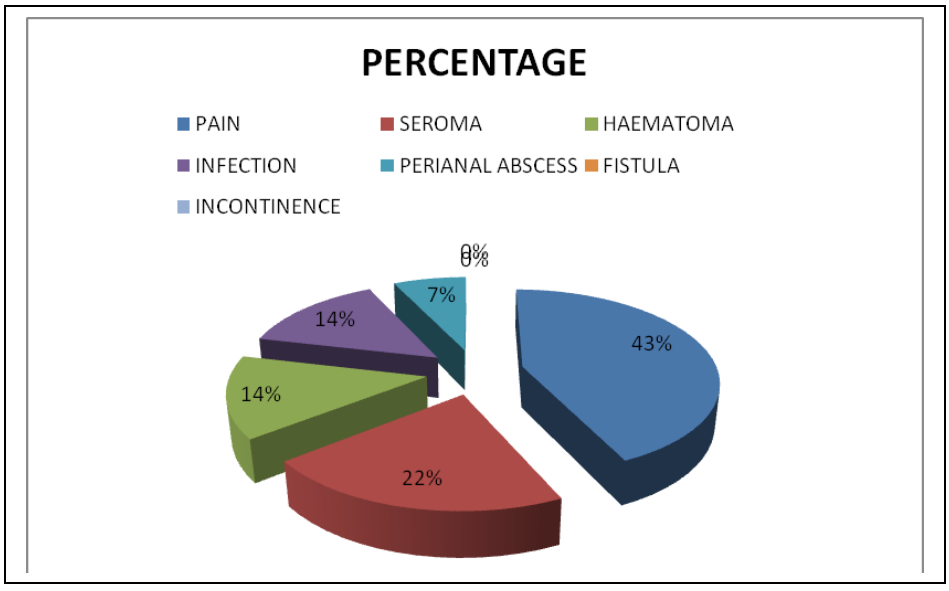


TABLE 9

COMPLICATIONS OF SURGERY

COMPLICATIONS	NO.OF PATIENTS	PERCENTAGE
PAIN	6	11.5
SEROMA	3	5.7
HAEMATOMA	2	3.8
INFECTION	2	3.8
PERIANAL ABSCESS	1	1.9
FISTULA	NIL	NIL
INCONTINENCE	NIL	NIL



Most of the surgical complications subsided within two weeks and patient had complete relief of symptoms. 6 out of 52 patients treated surgically did not turn up for follow up.

REVIEW OF LITERATURE

McLeod and Evans, in an article published in 2002, identified a total of nine randomized controlled trials in which the efficacy of GTN was studied.[69] Lund and Scholefield randomized 80 consecutive patients to receive treatments with topical 0.2% GTN ointment or a placebo. There were no significant differences observed in fissure healing among any of the treatment groups, but those who received 0.4% (1.5 mg) GTN ointment had a statistically significant decrease in pain intensity. The primary side effect was headache. Pitt and colleagues treated 1998 patients with 0.2% GTN ointment. They found that the presence of a sentinel pile adversely affected the outcome. To put it another way, the longer the fissure is present, the less likely GTN will be helpful. Others have opined that GTN (0.2%), on the basis of their randomized, placebo-controlled, double-blind trial, fails to demonstrate any advantage despite demonstrable increased anal canal blood flow and reduced anal pressures.

A similar study was conducted by Haseem Ahmed and Tariq Islam in D.H.Q Allied hospital, Faisalabad from November 2001 to October 2003 whose study also showed that topical GTN ointment for the treatment took longer duration and less effective in the healing of fissure in ano compared with Lateral anal sphincterotomy. Topical GTN produced headache in most of the patients.

CONCLUSION

1. During the period of study(MAY 2006 to OCTOBER 2008), 104 patients were studied .

2. These patients were broadly divided into two groups of 52 each who were treated by medical and surgical methods respectively by non-randomised control study.

3. In this study, males were commonly affected than females.

4. The most common age group were 41-50yrs.

5. Fissure in ano is rare in children and old age

6. Majority of the patients presented with pain during defecation.

7. Constipation was the major predisposing factor among all cases.

8. Most of the fissures were located in the posterior midline.

9. Most of the patients with fissures of long duration had sentinel skin tag and hypertrophied papilla.

10. Anterior fissures were slightly more common in females.

11. Two patients were HIV+ and one patient with history of tuberculosis had atypical lateral fissures.

12. No patients studied had inflammatory bowel disease.

13. Patients who were treated surgically by open partial lateral anal sphincterotomy had better relief of symptoms.

14. Most patients managed medically by 0.2% GTN did not have relief of symptoms after one month of treatment, who either discontinued treatment or required conversion to surgery.

15. Complication of Glyceryl trinitrate is headache which occurred in majority of patients.

16. Patients treated surgically had few complications in the perioperative period which subsided after two weeks.

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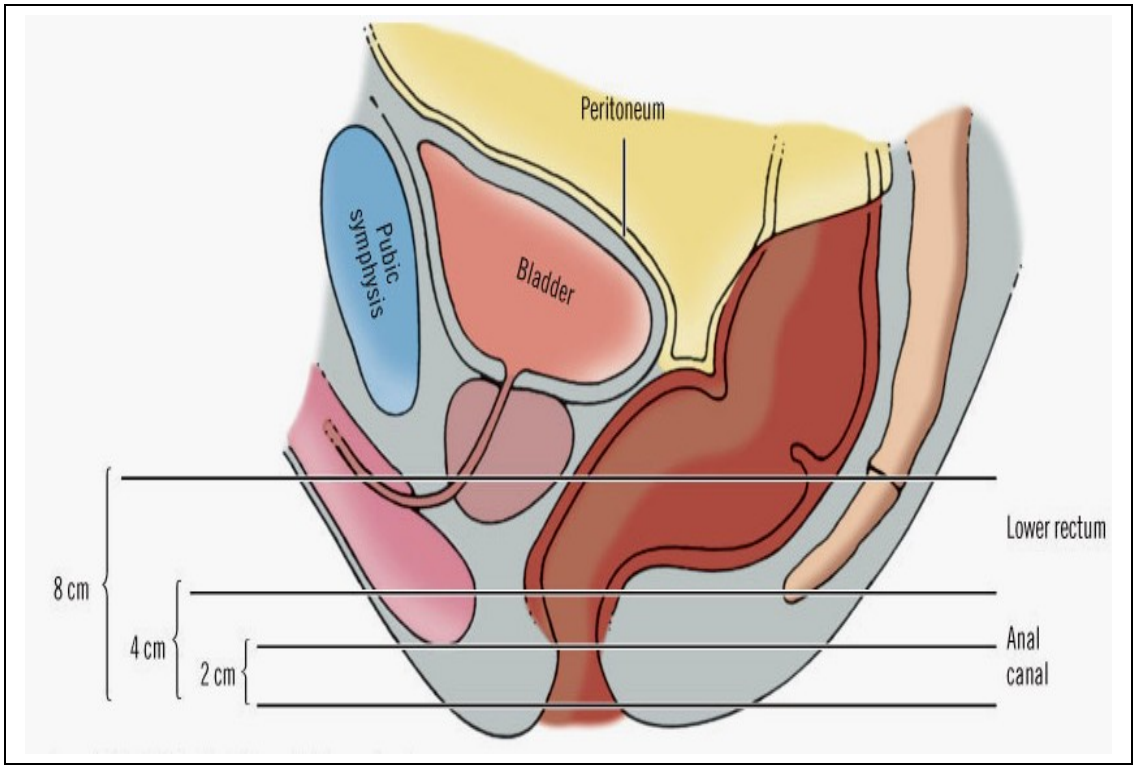
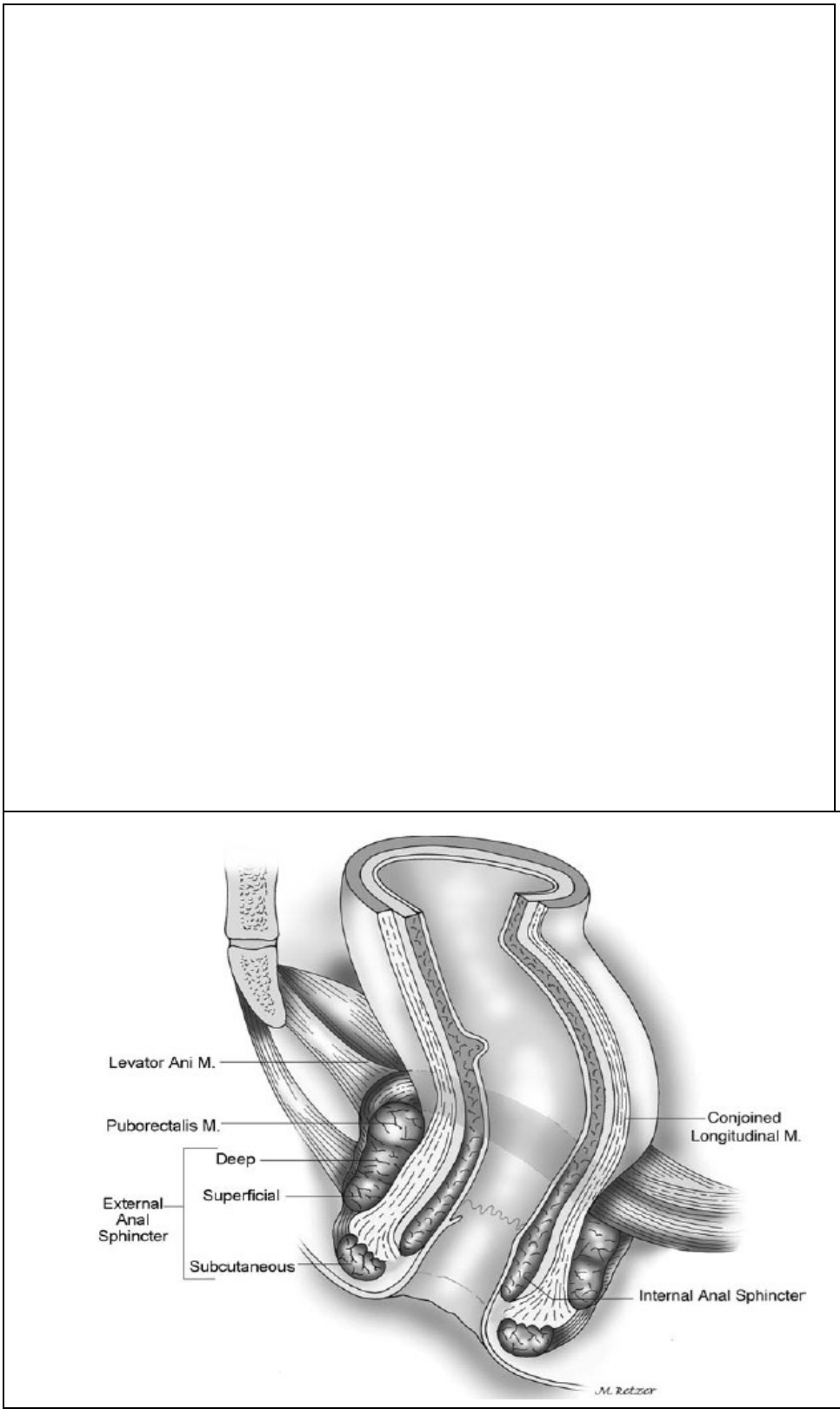
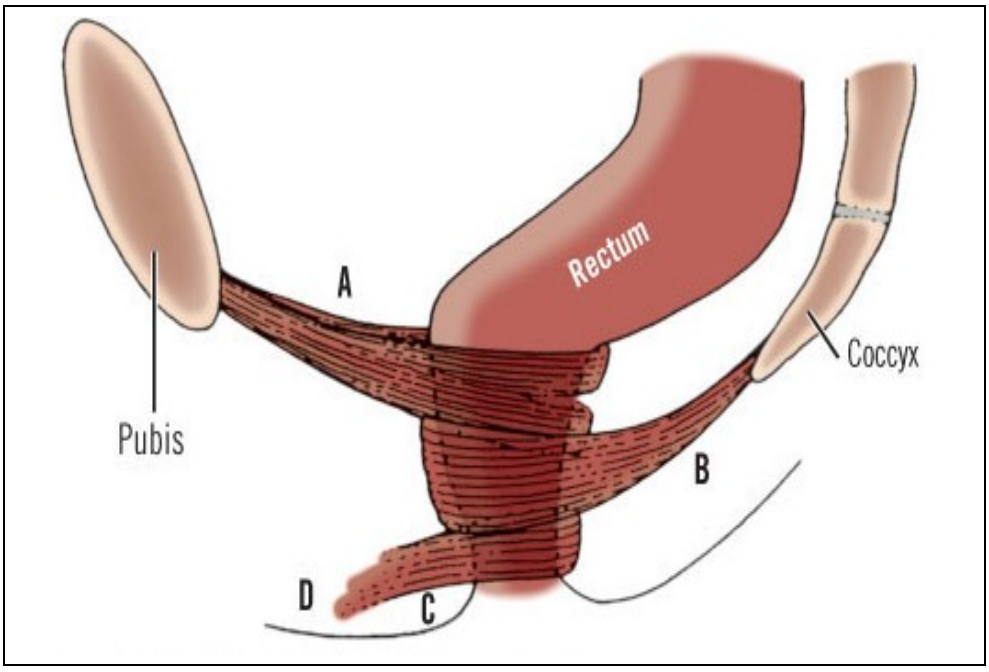
treatment of patients with chronic and fissure: long-term follow-up Eur J Surg 2002;168: 418-21.

RELATIONS OF ANAL CANAL



LAYERS OF ANORECTUM

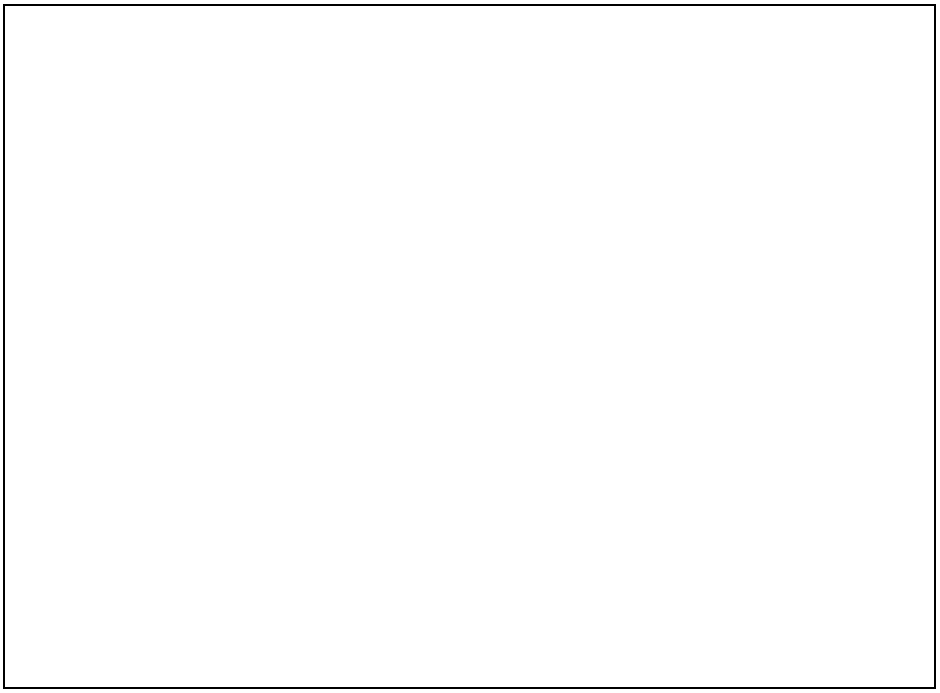




The three loops of the external anal sphincter: subcutaneous **(C),** superficial **(B),** and deep **(A).**

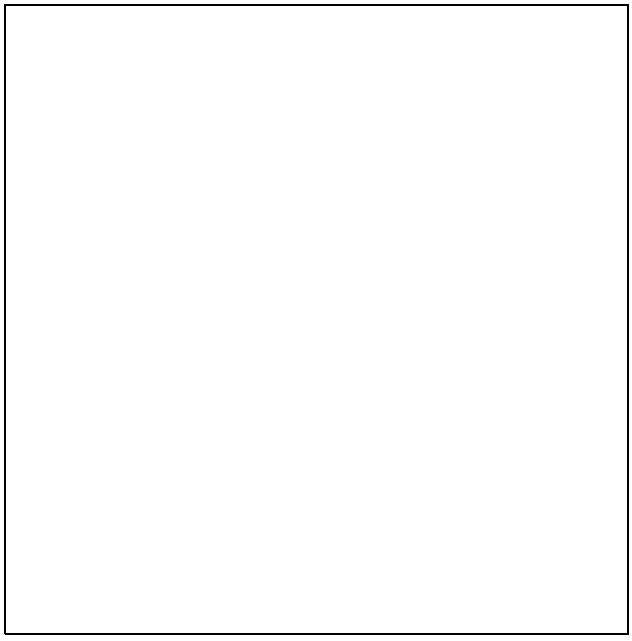
BLOOD SUPPLY OF ANORECTUM

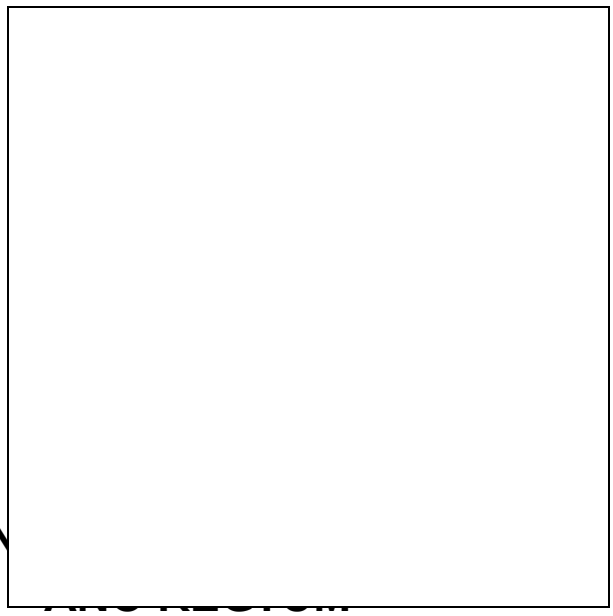
ARTERIAL SUPPLY



VENOUS DRAINAGE

LYMPHATIC DRAINAGE





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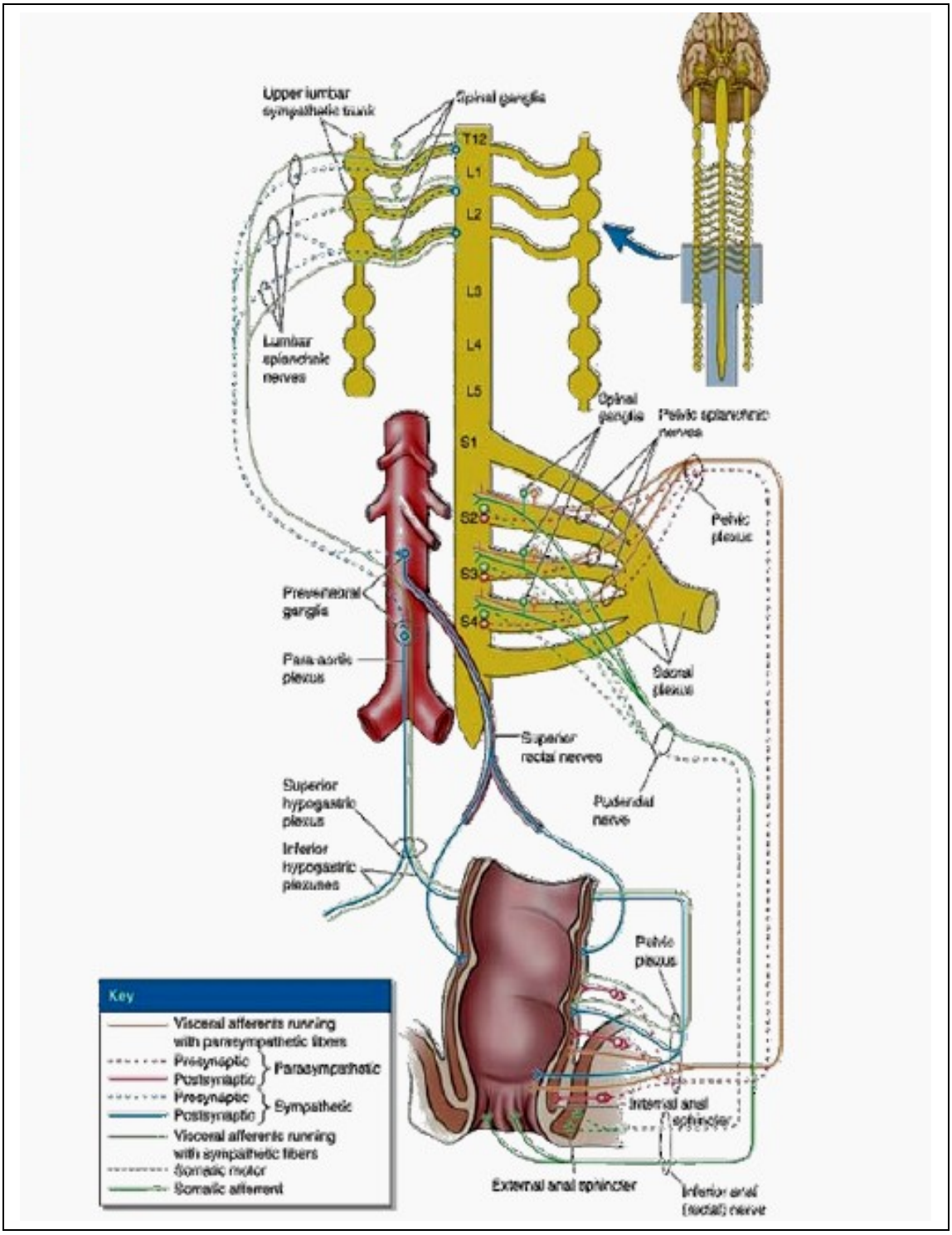
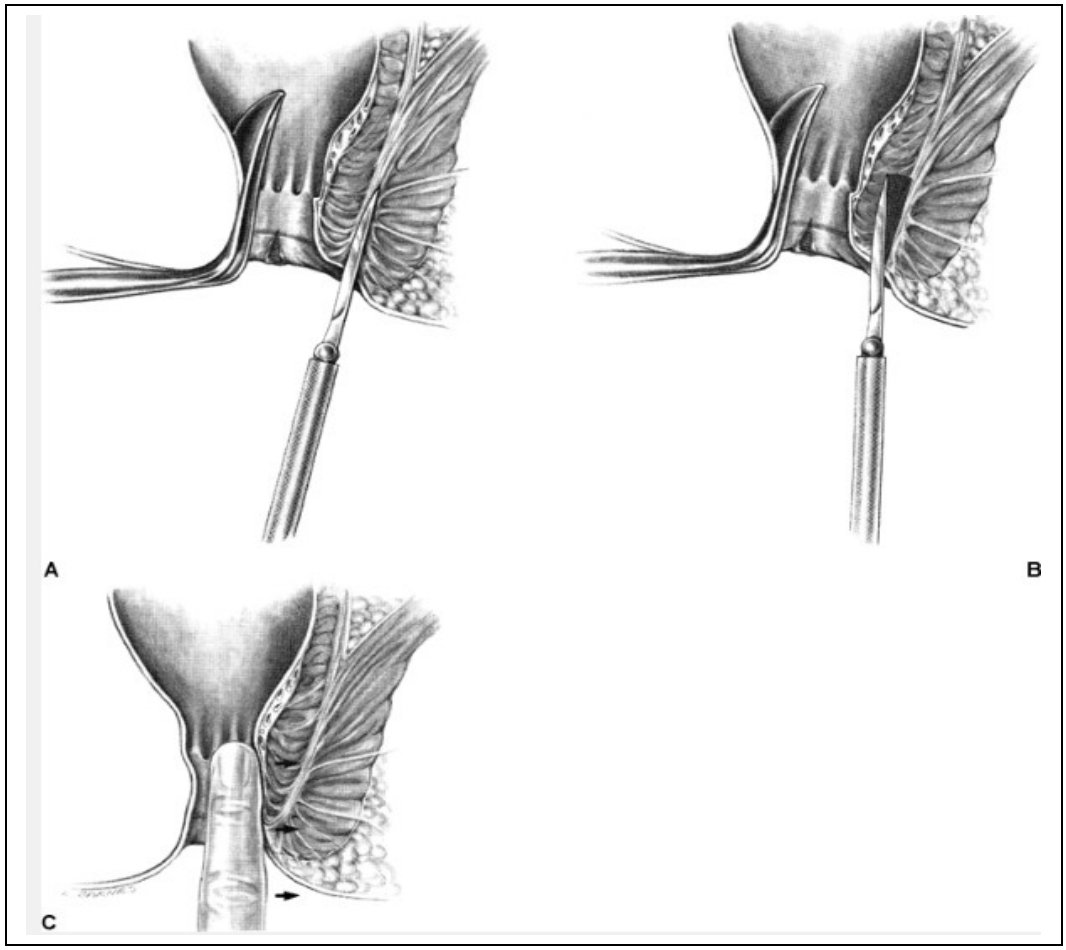


CLOSED LATERAL INTERNAL ANAL SPHINCTEROTOMY



Lateral internal anal sphincterotomy using the closed technique with a retractor. The patient is in the lithotomy position. (A) A knife is inserted into the intersphincteric groove. (B) The lower

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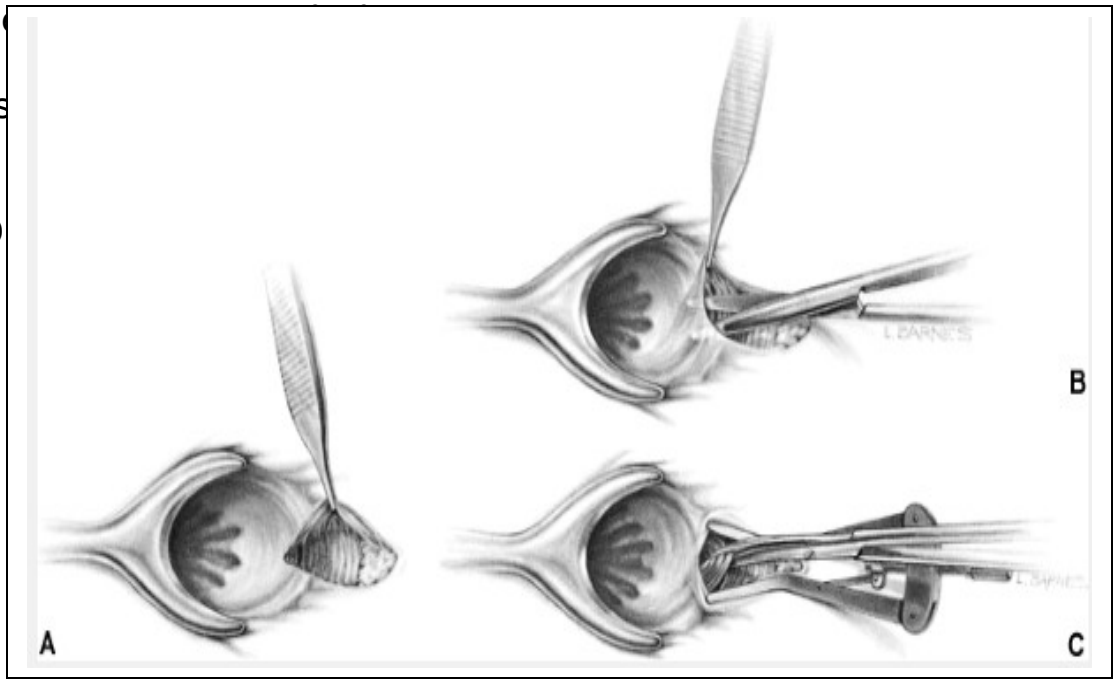
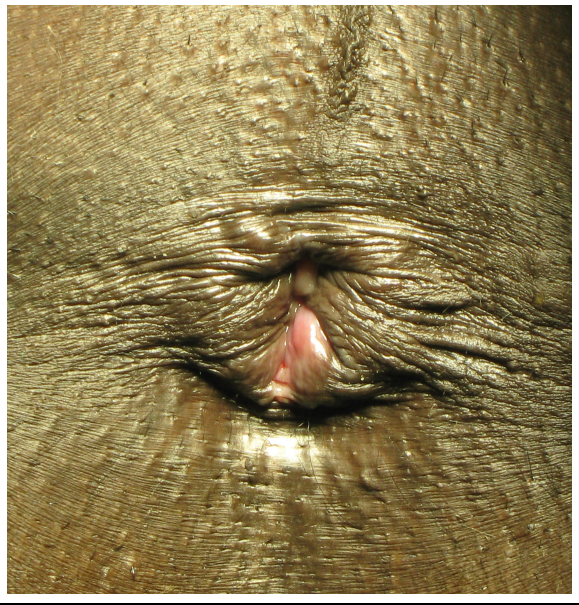
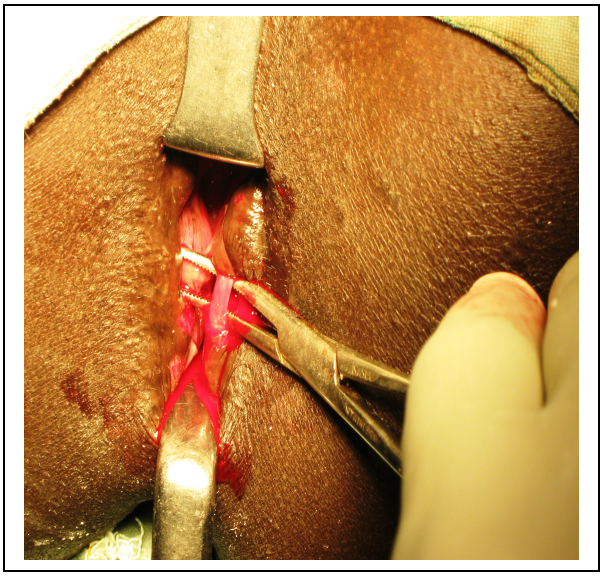


Lateral internal anal sphincterotomy using the open technique with the patient placed in the lateral or the prone (i.e., jackknife) position. (A) A radial incision is made across the intersphincteric groove. A narrow Hill-Ferguson retractor is in place. (B) The internal sphincter is separated from the anoderm by blunt dissection. (C) The internal sphincter is divided. The wound may be closed or left open.

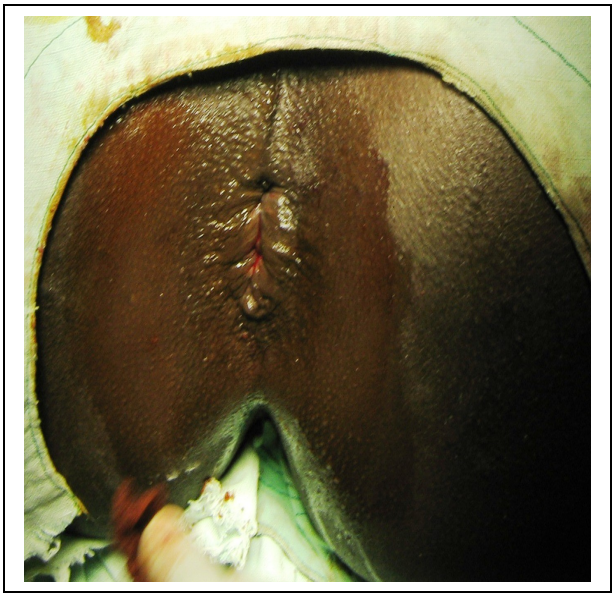


AL S

BEFORE SURGERY



POSTERIOR FISSURE IN ANO



INTERNAL SPHINCTER BEING HOOKED OUT BEFORE DIVISION

AFTER COMPLETION OF SPHINCTEROTOMY

TYPICAL POSTERIOR FISSURE IN ANO